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Computational Design of Polymer-based Nanoplatforms for Gene/drug Delivery Systems

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Recent progress in gene therapy has paved the way for a new array of treatments, establishing a foundation for next-generation technologies. A significant obstacle in gene therapy is the creation of effective gene delivery systems. Natural and synthetic macromolecules, with their adaptable nature as building blocks in soft nanotechnology, are crucial for developing specialized delivery vectors with customized compositions and functions. In this study, we present an innovative computational method designed to optimize polymers and/or nanocomposite architectures as effective components for polymer-based nanoplatforms. By combining state-of-the-art artificial intelligence techniques with advanced modeling approaches, we introduce an adaptive design strategy for these nanoplatforms. This collaborative approach illustrates how computational modeling can expedite the discovery of novel delivery vectors, unlocking new opportunities for technological advancements in gene therapy.

Acknowledgements: This work was supported through the "Nucleu" Program within the National Research Development and Innovation Plan 2022–2027, Romania, carried out with the support of MEC, project no. 61TE, code PN-IV-P2-2.1-TE-2023-0300 and project no. 27N/03.01.2023, code PN 23 24 01 02